UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/510,125 | 10/04/2004 | Shalaby W. Shalaby | SHA-38-PCT-US | 6610 |

29698 7590 11/04/2009

LEIGH P. GREGORY
PO BOX 168
CLEMSON, SC 29633-0168

| EXAMINER | |
|---|---|
| DICKINSON, PAUL W | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1618 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 11/04/2009 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/510,125 | SHALABY, SHALABY W. | |
| | Examiner | Art Unit | |
| | PAUL DICKINSON | 1618 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *05 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,5-8,12,17 and 18* is/are pending in the application.

4a) Of the above claim(s) *6 and 7* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 5, 8, 12 and 17-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

Applicant's election without traverse of (A) An absorbable stent coating comprising an antineoplastic agent and a non-steroidal anti-inflammatory drug in the reply filed on 8/5/2009 is acknowledged.

### *Response to Arguments*

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The rejection of claims 1 and 12 under 35 U.S.C. 103(a) as being unpatentable over EP 0952171 (EP '171) in view of '893 in further view of '747 (US 5149747) is maintained.

Applicant argues that EP '171 is directed to liquid copolymers. One of ordinary skill in the art would recognize that liquid polymers could not be used as necessarily solid coatings for endovascular stents.

Applicant's arguments have been fully considered but are not found persuasive. Regarding EP '171, no where does the reference require the copolymer to be in the liquid state, rather, the reference is directed to hydrogel-forming, self-solvating, absorbable polyester copolymers which form hydrogels upon contact with water (see abstract). Hydrogels are fully capable of acting as stent coatings. For further support,

the Examiner cites US 20020091433 (document already in record), which teaches that hydrogels are fully capable of acting as stent coatings (see paragraph 7). For the sake of argument, if the composition of EP '171 were restricted to liquid polymers, such liquid polymers are also known in the art to serve as stent coatings. For support, the Examiner cites US 20030083740 (document already in record), which teaches liquid polymer stent coatings (see paragraph 89).

***New Grounds of Rejection***

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0952171 (EP '171) in view of US 5149747 ('747) in further view of US 5681846 ('846).

EP '171 discloses hydrogel polyester copolymers and their utility in providing a protective barrier to prevent post-surgical adhesion, treatment of defects in conduits such as blood vessels, and controlled release of a biologically active agent for modulating cellular events such as wound healing and tissue regeneration (see abstract; ¶ 22-34). Triblock copolymers comprising a central polyoxyethylene segment and a terminal polyester segment formed from glyclide, lactide, and epsilon-caprolactone (cyclic monomers) are disclosed (see ¶ 53-57). Di-lactide/glycolide is exemplified (see Example I). The end groups can optionally be carboxylated by an acylation with an appropriate agent, such as succinic anhydride (see ¶ 54). The bioactive compounds to be incorporated include non-steroidal anti-inflammatory agents such as naproxen and anti-cancer drugs such as somatostatin analogs and mixtures thereof (see ¶ 57 and 66). The reference discloses that a combination of two or more drugs may be necessary for optimal effectiveness (see ¶ 66). The polymers may have one or more ionically bound bioactive peptides or a proteins, such as naproxen (see ¶ 46, 32, and 84; Example XV). EP '171 fails to disclose introduction of at least one

carboxyl side group by free-radically achieved maleation. EP ‘171 further fails to disclose an antineoplastic drug such as Paclitaxel.

‘747 discloses that succinic anhydride, glutaric anhydride, and maleic anhydride are excellent acylating reagents for the preparation of esterified graft copolymers (see col 4, lines 51-54).

‘846 discloses that Paclitaxel exhibits potent anticancer activity (see col 1, lines 12-20).

It would have been obvious to one of ordinary skill in the art at the time the instant invention was made to introduce the carboxyl side group by free-radically achieved maleation (i.e. reaction with maleic anhydride). EP '171 contemplates acylation of the terminal di-lactide/glycolide with an appropriate agent, and succinic anhydride (disclosed by EP '171), glutaric anhydride (disclosed by '893) and maleic anhydride (disclosed by '747) are known in the art as effective agents for carrying out such acylations. Thus, using free-radical maleation to introduce a carboxyl group into the polymer of EP ‘171 is no more than using an art-recognized means (free-radical maleation) to fulfill an art-recognized need (adding a carboxyl side group to the polymer of EP ‘171).

It would be further obvious to incorporate Paclitaxel as the anti-cancer agent of EP ‘171, as the art recognizes that this compound exhibits potent anticancer activity.

The above references do not appreciate the utility of the composition to be used as a stent coating. The phrase recited in instant claim 1 “stent coating composition for multifaceted prevention of vascular restensosis through a plurality of

physicopharmacological modes" is, however, an intended use limitation. A recitation of an intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In the instant case, the composition disclosed by EP '171 is fully capable of being used as a stent coating for multifaceted prevention of vascular restensosis through a plurality of physicopharmacological modes. For further support, the Examiner cites US 20020091433 (document already in record), which teaches that hydrogels are fully capable of acting as stent coatings (see paragraph 7).

Claims 1, 8, 12, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0952171 (EP '171) in view of US 5149747 ('747) in further view of US 5681846 ('846) in further view of US 5304121 ('121). The relevant portions of EP '171, '747 and '846 are given above. The references fail to teach a metallic endovascular stent coated with the hydrogel composition.

'121 discloses nitinol (metallic) endovascular stents coated with a hydrogel wherein the hydrogel provides controlled release of anti-thrombogenic compounds such as heparin (see abstract; col 1, line 44 to col 3, line 51; col 9, line 35 to col 10, line 11). '121 provides guidance for which hydrogels are appropriate in the invention and points to polyethylene oxides and polyesters such as polycaprolactone, polylactic acids, and polyglycolic acids as good candidates (see col 3, lines 1-5 and 33-36). The hydrogel coating is characterized by the ability to incorporate a substantial amount of the drug

and is swellable such that the aqueous drug solution can be effectively squeezed out of the coating when pressure is applied (see col 5, line 61 to col 6, line 20). Administration of the drug in this way after angioplasty enables site-specific delivery of the anti-thrombogenic compound at high concentrations (see ibid).

It would have been obvious to one of ordinary skill in the art to use the polyester hydrogel of EP '171 as the stent coating of the '121. The polyester hydrogel of EP '171 may be used to provide a hydrogel barrier to prohibit fibrotic tissue production on traumatized tissue and as a carrier for dispensing anti-cancer agents, such as heparin (an anti-thrombogenic compound) (see EP '171: paragraph 52). Further, the hydrogel of EP '171 is self-solvating, absorbable, and able to contain large amounts of the drug. Thus, the polyester hydrogel of EP '171 is a good candidate for use as the hydrogel coating of '121. Incorporation of the hydrogel of EP '171 as the stent coating of '121 will enable site-specific delivery of the drug at high concentrations. The anti-thrombogenic drug(s) will be applied to the vessel wall by active diffusion and directly into the tissue at high concentrations, thereby preventing restensosis following angioplasty. Such a hydrogel coated stent reads on an absorbable stent (instant claim 18), as a portion of the stent (the coating) is absorbed into the tissue.

## ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL DICKINSON whose telephone number is (571)270-3499. The examiner can normally be reached on Mon-Thurs 9:00am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Hartley can be reached on 571-272-0616. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Eric E Silverman/
Primary Examiner, Art Unit 1618

Paul Dickinson
Examiner
AU 1618

October 28, 2009